

What is claimed is:

1. A combiner for combining a plurality of received diversity signals in a radio receiver and producing therefrom a combined output signal, said combiner comprising a gain control engine configured for determining the strength of each said received signal and said combined output signal and for controlling a gain controller on the basis of the results of said determinations, whereby said gain controller inverts a weakest one of said received signals for combination with the other said received signals when such inversion increases the strength of said combined output signal.
2. A combiner according to claim 1 wherein said gain control engine makes a first determination of the strength of said combined output signal before said weakest received signal is inverted and a second determination of the strength of said combined output signal after said weakest received signal has been inverted, and wherein said inversion of said weakest received signal is continued when said strength of said second determination increases over that of said first determination and is reversed when said strength of said second determination decreases over that of said first determination.
3. A combiner according to claim 2 wherein said first and second determinations and inverting of said weaker signal are repeated either periodically or upon the occurrence of a reduction of said strength of said combined output signal by a predetermined amount.
4. A combiner according to claim 3 wherein said gain control engine is configured for determining the noise in received signal channels and said controlling of said gain controller is based also on signal-to-noise ratios determined

for said received signals whereby each said received signal is amplified by a gain proportional to said signal-to-noise ratio determined therefor.

5. A combiner according to claim 4 wherein said gain controller comprises an automatic gain controller (AGC) for each said received signal.

5 6. A combiner according to claim 5 wherein said gain control engine comprises a digital signal processor.

7. A method for combining a plurality of received diversity signals in a radio receiver and producing therefrom a combined output signal, said method comprising determining the strength of each said received signal and said
10 combined output signal and controlling the gain of said received signals on the basis of the results of said determinations, whereby a weakest one of said received signals is inverted for combination with the other said received signals when such inversion increases the strength of said combined output signal.

8. A method according to claim 7 including making a first determination of the
15 strength of said combined output signal before said weakest received signal is inverted and a second determination of the strength of said combined output signal after said weakest received signal has been inverted, and continuing said inversion of said weakest received signal when said strength of said second determination increases over that of said first determination and reversing said inversion of said
20 weakest received signal when said strength of said second determination decreases over that of said first determination.

9. A method according to claim 8 whereby said first and second determinations and inverting of said weaker signal are repeated either periodically or upon the
25 occurrence of a reduction of said strength of said combined output signal by a predetermined amount.

10. A method according to claim 3 including determining the noise in received signal channels and controlling said gain also on the basis of said signal-to-noise ratios determined for said received signals whereby each said received signal is amplified by a gain proportional to said signal-to-noise ratio determined therefor.